

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

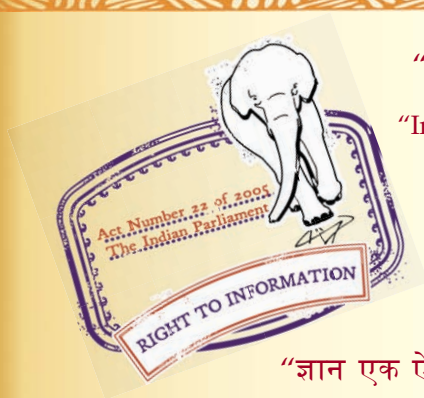
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 15288-1 (2003): Bonded Abrasives - Determination and Designation of Grain Size Distribution, Part 1: Macrogrits F 4 to F 220 [PGD 9: Abrasives]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



भारतीय मानक

बंधित अपघर्षक — कण साईज ज्ञात करना और उनका वितरण

भाग 1 बृहत्त रोड़ी एफ 4 से एफ 220 तक

Indian Standard

**BONDED ABRASIVES — DETERMINATION AND
DESIGNATION OF GRAIN SIZE DISTRIBUTION**

PART 1 MACROGRITS F 4 TO F 220

ICS 25.100.70

© BIS 2003

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

NATIONAL FOREWORD

This Indian Standard (Part 1) which is identical with ISO 8486-1:1996 'Bonded abrasives — Determination and designation of grain size distribution — Part 1: Macrogrits F4 to F220' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Abrasives Sectional Committee and approval of the Basic and Production Engineering Division Council.

The other part of this Indian Standard is:

IS 15288 (Part 2):2003 Bonded abrasives — Determination and designation of grain size distribution:
Part 2 Microgrits F 230 to F 1 200

The text of the ISO Standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to the following International Standard for which Indian Standard also exists. The corresponding Indian Standard which is to be substituted in its place is listed below along with its degree of equivalence for the edition indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 9138:1993 Abrasive grains — Sampling and splitting	IS 15290 : 2003 Abrasive grains — Sampling and splitting	Identical

Where there are no corresponding Indian Standards for the International Standards referred in this Indian Standard, reference to the relevant International Standards may be made.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

**BONDED ABRASIVES—DETERMINATION AND
DESIGNATION OF GRAIN SIZE DISTRIBUTION**

PART 1 MACROGRITS F 4 TO F 220

1 Scope

This part of ISO 8486 sets forth a method for determining or checking the size distribution of macrogrits from F4 to F220 in fused aluminium oxide and silicon carbide.

It specifies the grit designation for the testing of those grits used in the manufacture of bonded abrasive products and general industrial applications and those removed from bonded products.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8486. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8486 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3310-1:1990, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*.

ISO 9138:1993, *Abrasive grains — Sampling and splitting*.

ISO 9284:1992, *Abrasive grains — Test-sieving machines*.

3 Definitions

For the purposes of this part of ISO 8486 the following definitions apply.

3.1 abrasive grain: Synthetic particulate substance manufactured by crushing and classified into specific grit sizes used for the removal of surplus material by grinding, polishing, lapping, etc.

3.2 grain size distribution: The percentage of individually sized particles contained in the designated grit sizes.

4 Grain size distribution testing

4.1 Equipment

4.1.1 Sieving machine, in accordance with ISO 9284.

4.1.2 Sieves having the aperture sizes indicated in table 1, in accordance with ISO 3310-1.

Test sieves are designated by their aperture size in micrometres if the aperture is less than 1 mm and in millimetres if it is equal to or greater than 1 mm.

4.1.3 Balance accurate to $\pm 0,1$ g.

4.1.4 Timer able to operate for 5 min, with an accuracy of at least ± 5 s.

Table 1 — Series test sieves — Aperture sizes

Nominal sizes and tolerances of aperture sizes	
mm	µm
8 ± 0,25	
6,7 ± 0,21	
5,6 ± 0,18	
4,75 ± 0,15	
4 ± 0,13	
3,35 ± 0,11	
2,8 ± 0,09	
2,36 ± 0,08	
2 ± 0,07	
1,7 ± 0,06	
1,4 ± 0,05	
1,18 ± 0,04	
1 ± 0,033	
	850 ± 29
	710 ± 25
	600 ± 21
	500 ± 18
	425 ± 16
	355 ± 13
	300 ± 12
	250 ± 9,9
	212 ± 8,7
	180 ± 7,6
	150 ± 6,6
	125 ± 5,8
	106 ± 5,2
	90 ± 4,6
	75 ± 4,1
	63 ± 3,7
	53 ± 3,4
	45 ± 3,1

4.2 Procedure

4.2.1 Sample

Take 100 g of grits to be tested from a statistically representative sample in accordance with ISO 9138. The sample to be tested must be dry. Failing this, it must be dried at a temperature of 105 °C until constant weight is reached.

4.2.2 Arrangement of test sieves

Assemble the desired nest of sieves (4.1.2) used for testing each grit category (see table 2) in order of mesh size with the coarsest sieve on the top, progressing to the finest with a pan on the bottom.

Pour the test sample on to the coarsest test sieve, place a cover on the top sieve, and place the entire unit in the sieving machine (4.1.1) with a receiver.

4.2.3 Sieving

Set the timer (4.1.4) controlling the sieving machine and switch on. After sieving is completed, the grit retained on the sieves and in the bottom pan is transferred to a balance (4.1.3) pan and weighed separately beginning with the residue on the coarsest test sieve.

5 Standard grading limits

5.1 Standard grit sizes of fused aluminium oxide and silicon carbide abrasives

Table 2 lists the permissible grading limits for the sizing of fused aluminium oxide and silicon carbide abrasive grain for use in bonded abrasive products and other loose grain applications.

5.2 Interpretation of the sieving test results

The sample is in accordance with this part of ISO 8486 when the values for the residue on the different sieves are within the permissible limits given in table 2. The residue on test sieve 1 corresponds exclusively to 100 g of the tested material in accordance with 4.2.1.

When checking the measured results, allowance must be made for the variations due to the measuring technique. These permissible deviations, given in table 3, have been determined on the basis of the standard deviations resulting from a cooperative test carried out by ISO. The tolerances for production macrogrits given in table 2, are to be increased by these values.

5.3 Example of use of tables 2 and 3

The following is an example of the use of this part of ISO 8486 for an F10 macrogrit:

Taking grit F10, all material shall pass through the coarsest sieve (in this case sieve aperture 3,35 mm). All material may pass through the next coarsest sieve (aperture 2,36 mm), but not more than 20 % may be retained on it.

At least 45 % of the sample shall be retained on the sieve aperture 2 mm but it is permissible to have 100 % pass through sieve aperture 2,36 mm and remain on sieve aperture 2 mm.

The total grit passing through sieve aperture 2,36 mm and retained on sieve aperture 2 mm and sieve aperture 1,7 mm shall add up to at least 70 %. Consequently, if 45 % was retained on sieve aperture 2 mm, then at least 25 % shall be retained on the sieve aperture 1,7 mm.

There is no requirement for material retained on the finest sieve, in this case the sieve aperture 1,4 mm,

but not more than 3 % is permitted to pass through the sieve aperture 1,4 mm.

It is easy to determine from this example the procedure to be followed for each grain size in the table.

The post delivery testing of the grit F10 should include the variations shown in table 3. In the case of test sieve 2 it means that the 20 % value increases to 24 % according to table 3 (plus 4 %).

6 Designation

The designation of macrogrits for fused aluminium oxide or silicon carbide complying with the require-

ments of this part of ISO 8486 shall comprise

- the type of abrasive;
- the designation of the grit including the letter "F" for a bonded abrasive followed by a characteristic number representing the grit size.

EXAMPLE

Silicon carbide - F80

Type of abrasive _____
Designation of the grit _____

Table 2 — Size distribution of macrogrits F4 to F220

Grit designation	Test sieves																Re- mainder in the bottom pan ΔQ max.
	1			2			3			3 and 4			3, 4 and 5				
	Aperture size sieve 1		Resi- due	Aperture size sieve 2		Resi- due	Aperture size sieve 3		Resi- due	Aperture size sieve 4		Sum of the residues	Aperture size sieve 5		Sum of the residues		
	w_1	Q_1		w_2	Q_2	max.	w_3	Q_3	min.	w_4	$Q_3 + Q_4$	min.	w_5	$Q_3 + Q_4 + Q_5$	min.		
	mm	μm	%	mm	μm	%	mm	μm	%	mm	μm	%	mm	μm	%	%	
F4	8	—	0	5,6	—	20	4,75	—	40	4	—	70	3,35	—	1)	3	
F5	6,7			4,75			4			3,35			2,8				
F6	5,6			4			3,35			2,8			2,36				
F7	4,75			3,35			2,8			2,36			2				
F8	4	—	0	2,8	—	20	2,36	—	45	2	—	70	1,7	—	1)	3	
F10	3,35			2,36			2			1,7			1,4				
F12	2,8			2			1,7			1,4			1,18				
F14	2,36			1,7			1,4			1,18			1				
F16	2	—	0	1,4	—	20	1,18	—	45	1	—	70	850	—	1)	3	
F20	1,7			1,18			1			850			710				
F22	1,4			1			—			710			600				
F24	1,18			—			850			25			—				710
F30	1	—	0	710	—	25	600	—	45	500	—	65	425	—	1)	3	
F36	850			600			500			425			355				
F40	710			500			425			355			300				
F46	600			425			355			300			250				
F54	500	—	0	355	—	30	300	—	40	250	—	65	212	—	1)	3	
F60	425			300			250			212			180				
F70	355			250			212			180			150				
F80	300			212			180			150			125				
F90	250	—	0	180	—	20	150	—	40	125	—	65	106	—	1)	3	
F100	212			150			125			106			75				
F120	180			125			106			90			63				
F150	150			106			75			63			45				
F180	125	—	0	90	—	15	75	1)	—	63	40	—	53	65	1)		
F220	106			75			63			53			45				60

1) Not specified.

Table 3 — Permissible deviation as a result of variations in the measuring technique

Grit designation	Test sieve No.					Remainder of grit in the bottom pan %
	1	2	3	3 and 4	3, 4 and 5	
	Permissible deviation %					
F4	0	+ 4	- 4	- 4	—	—
F5						
F6						
F7						
F8	0	+ 4	- 4	- 4	—	—
F10						
F12						
F14						
F16	0	+ 4	- 4	- 4	—	—
F20						
F22						
F24						
F30	0	+ 4	- 4	- 4	—	—
F36						
F40						
F46						
F54	0	+ 4	- 4	- 4	—	—
F60						
F70	0	+ 3	- 3	- 3	—	—
F80						
F90	0	+ 3	- 3	- 3	—	—
F100						
F120						
F150						
F180	0	+ 3	- 3	- 3	- 3	—
F220						

NOTE — Percentages are of original sample mass.

Annex A
(informative)

Bibliography

- [1] ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings.*
- [2] ISO 8486-2:1996, *Bonded abrasives — Determination and designation of grain size distribution — Part 2: Microgrits F230 to F1200.*

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publication), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. BP 09 (0293).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 323 01 31, 323 3375, 323 94 02

Telegrams: Manaksanstha
(Common to all offices)

Regional Offices:

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	323 76 17, 323 38 41
Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 337 84 99, 337 85 61 337 86 26, 337 91 20
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	{ 60 38 43 60 20 25
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 254 12 16, 254 14 42 254 25 19, 254 13 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	{ 832 92 95, 832 78 58 832 78 91, 832 78 92
Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.	